PACKAGING

THE CAHNERS MAGAZINE FOR DECISION-MAKERS/ DECEMBER 1989

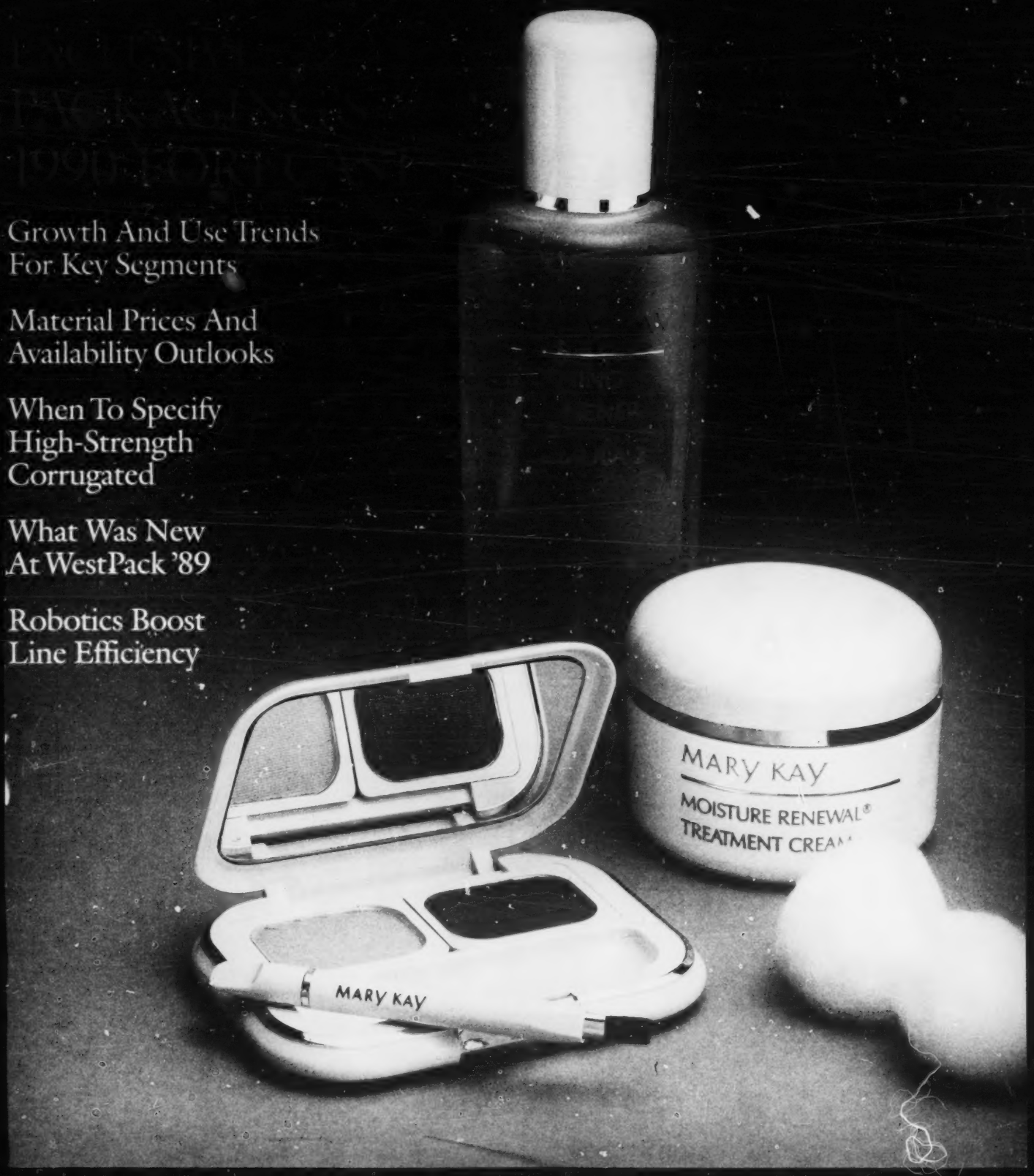
Growth And Use Trends For Key Segments

Material Prices And Availability Outlooks

When To Specify High-Strength Corrugated

What Was New At WestPack '89

Robotics Boost Line Efficiency



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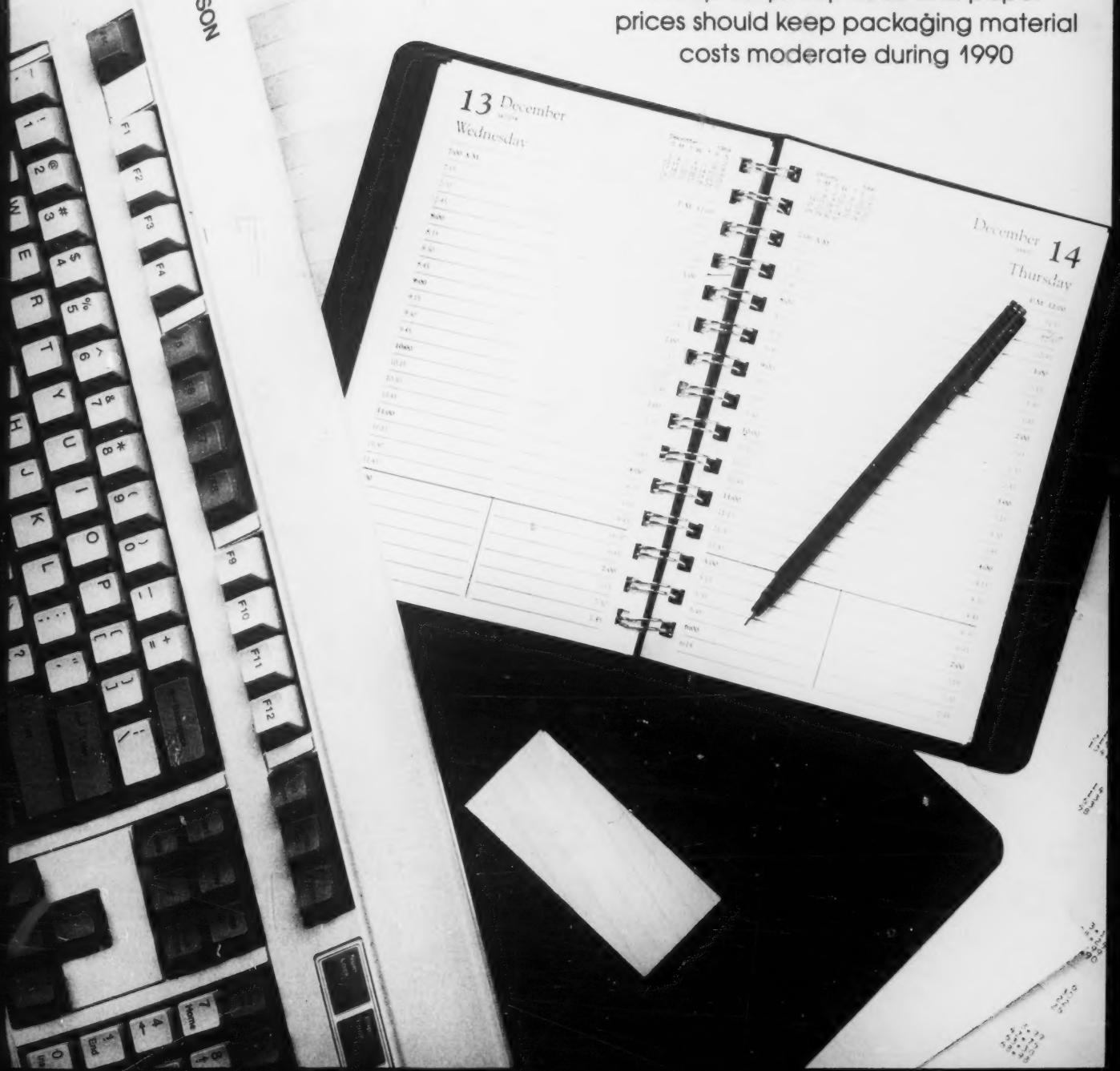
Most Material Costs To Fall In 1990

Steep drops in plastic and paper prices should keep packaging material costs moderate during 1990



For the most part, 1990 should be a good year for packaging.

Despite a mild slowdown in many key sectors of the economy, stability is the term that best characterizes the outlook for the coming year.

For packagers of America's gross national product, the best news is that most industries will begin a new cycle of growth in 1990, while most material and supply costs will remain stable or even decline slightly.

Employing a new and exclusive methodology, PACKAGING's editors forecast that overall spending for packaging materials, containers and supplies will grow 5.5 percent in 1990, to a total of $74.725 billion.

These are among the conclusions reached in compiling PACKAGING's first, in-depth forecast for the packaging field. The purpose of this extensive effort is to give you a detailed basis for your own planning in 1990 and beyond.

The ground-breaking aspects of this forecast should be noted. For the first time anywhere in the field, we detail the value of packaging consumed by nine key industries and forecast the growth in such spending for each through 1991. In addition, we analyze the critical trends affecting packaging in each industry. The result is the first forecast that details the different dynamics and growth rates affecting packaging in the key industries which consume more than 80 percent of all packaging.

We supplement this core of data with projections of the changing costs of the most widely used packaging materials and containers and of the general economic indicators that have the most impact on packaging use.

For these, and as a base for our packaging forecasts, we have relied heavily on the experience, expertise and computer models of Cahners Economics.

James Haughey, Cahners chief economist and v.p.-research and economics, jokes that for the general economy, "we're looking at a pretty boring year; 1990 will look a lot like 1989, though in a reverse pattern, with growth picking up as the year wears on." The result, he says, is that the economy will be in better shape next December than a month from now.

Cahners forecasts for key measures of the general economy reflect this trend. Real gross national product is projected to grow 2.3 percent in 1990, and 3.0 percent in 1991, vs. 2.4 percent in 1989.

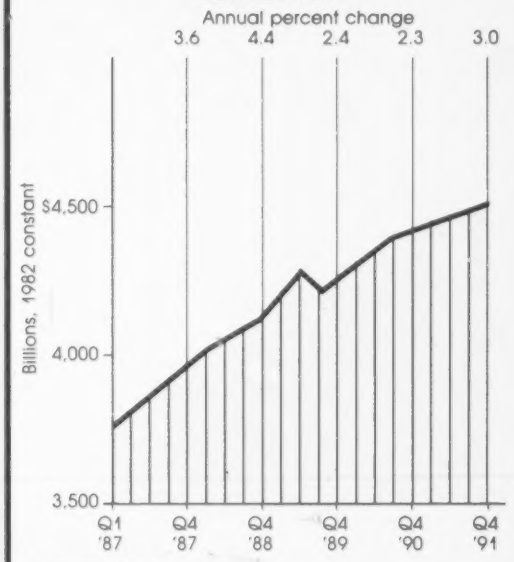
Forecasts for real disposable income and consumer spending show slightly more pronounced swings. Real disposable income—that is, personal income after taxes—will grow at a 2.5 percent rate in 1990, following growth of 3.7 percent this year. Growth of real consumer spending will drop to 1.7 percent in 1990 from 2.0 percent in 1989.

Growth in the value of total manufacturing shipments is a key barometer, because its components serve as the base for our packaging forecasts. Following strong current-dollar growth of 9.3 percent in 1988 and 7.2 percent this year, growth will slow to 5.4 percent in 1990 before increasing to 9.2 percent in 1991.

The bottom line for packaging is a slightly slower year in 1990, followed by stronger growth in 1991. The slowdown early in '90 is a good time to closely analyze production capacity and ready new products, Haughey suggests, to take advantage of stronger markets in 1991.

—The Editors

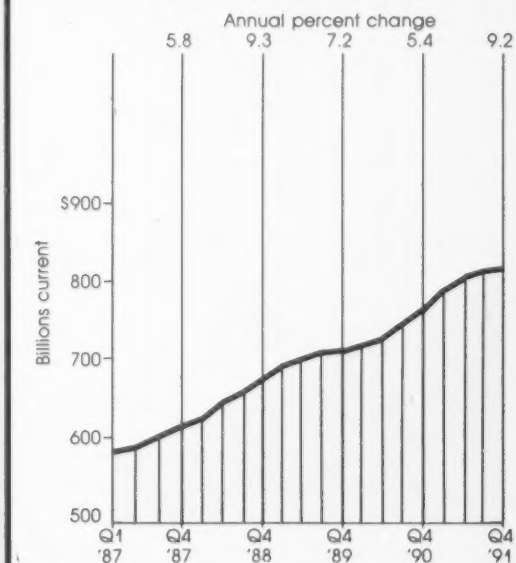
REAL GROSS NATIONAL PRODUCT CONTINUES UPWARD, BUT SLOWLY



Data source: Dept. of Commerce
Forecast source: Cahners Economics

Gross National Product appears unlikely to zoom in the near future, but real growth is still in the offing.

TOTAL MANUFACTURING SHIPMENTS GROWTH TO DIP THEN RISE



Data source: Dept. of Commerce
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Growth of total manufacturing shipments will slow in '90, then rise strongly in 1991.

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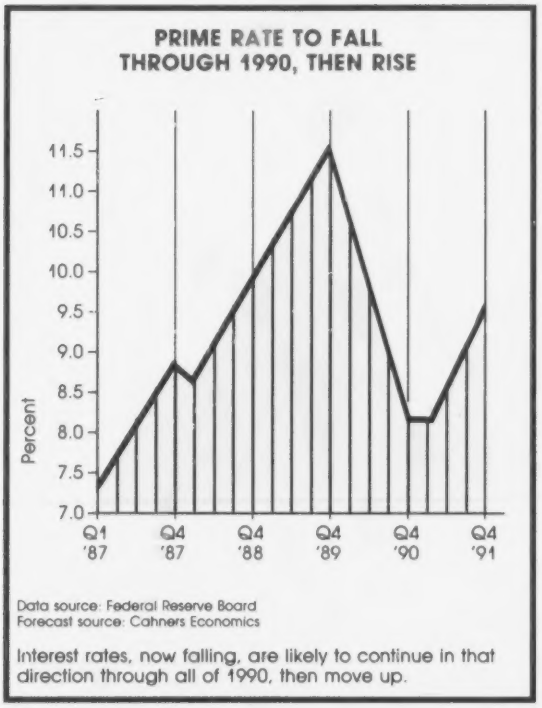
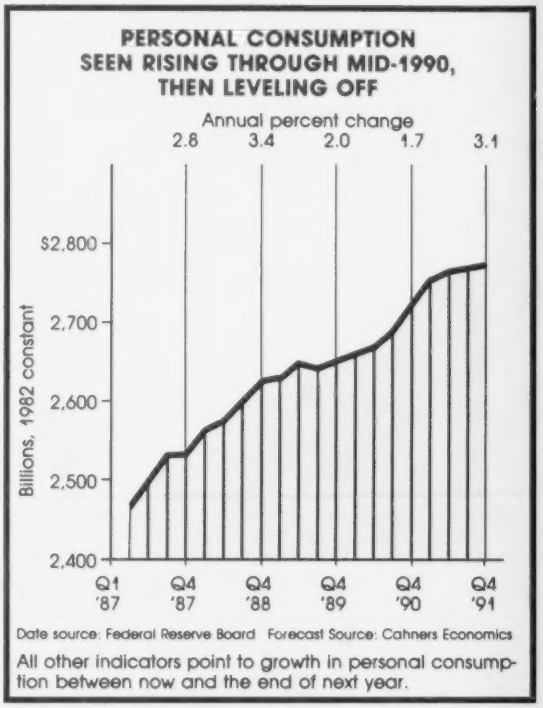
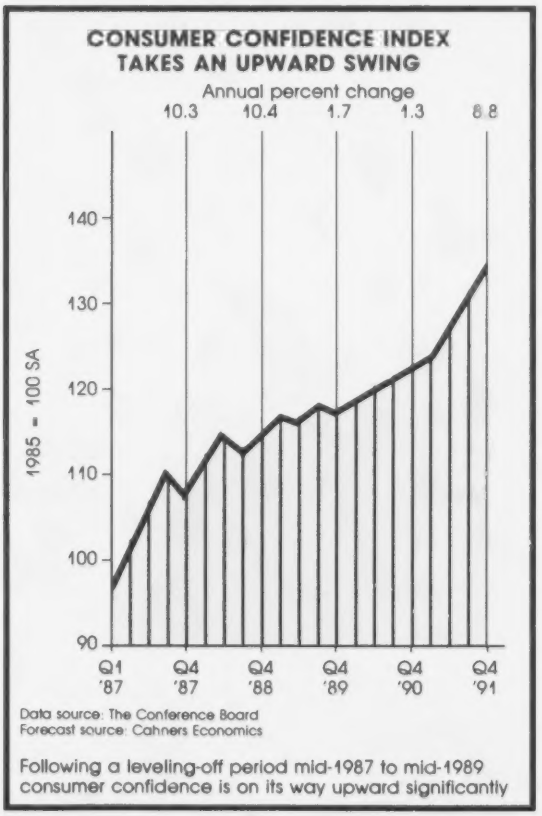
Growth of key consumer spending, confidence measures to slow then rise in 1991



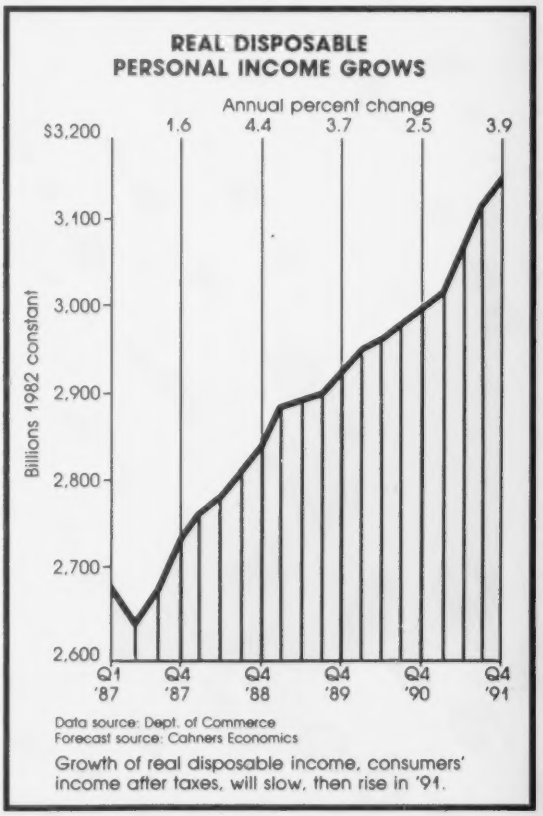
Interest rates, now falling, are likely to continue in that direction through all of 1990, then move up.



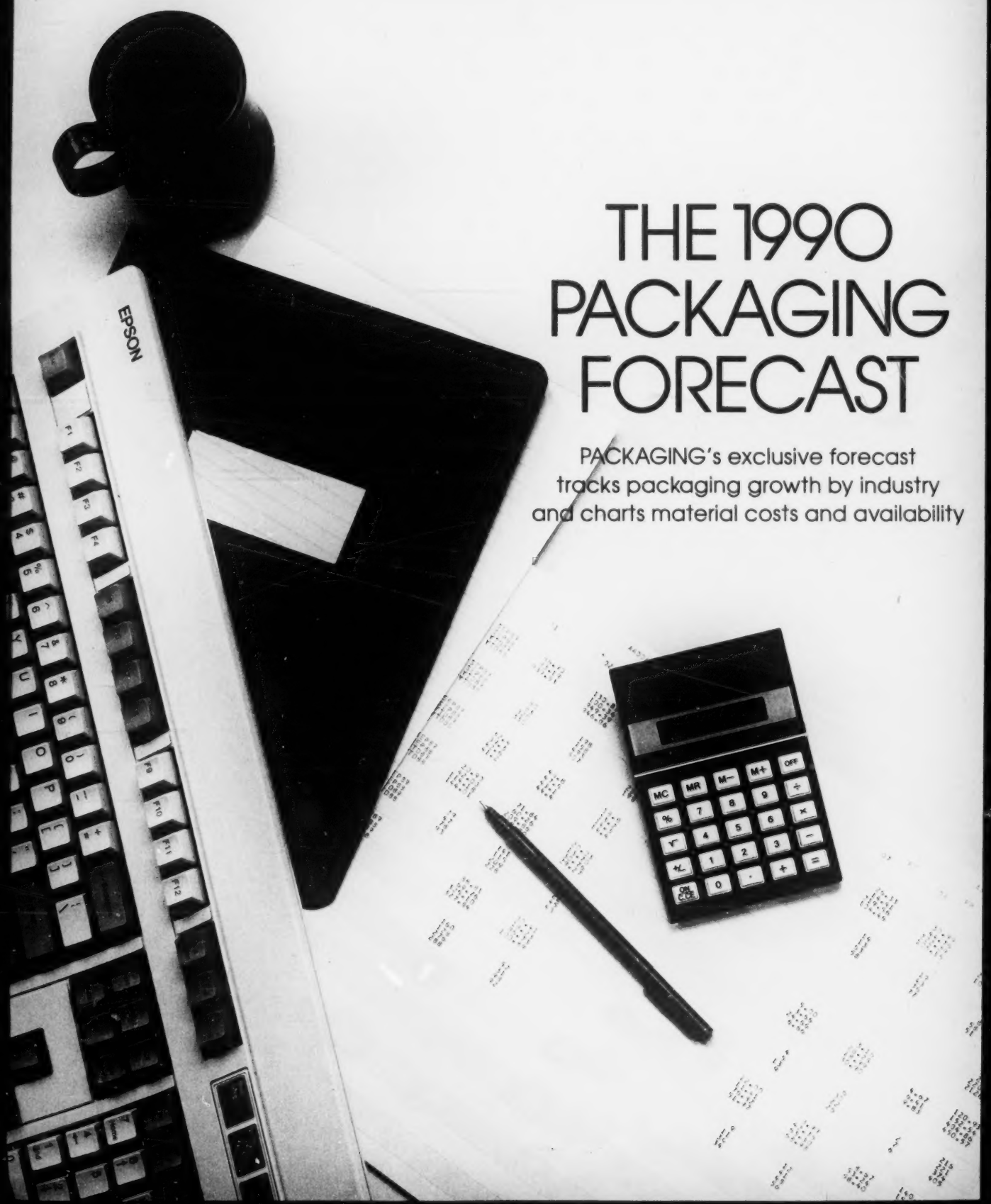
All other indicators point to growth in personal consumption between now and the end of next year.



Following a leveling-off period mid-1987 to mid-1989 consumer confidence is on its way upward significantly



Growth of real disposable income, consumers' income after taxes, will slow, then rise in '91.



THE 1990 PACKAGING FORECAST

PACKAGING's exclusive forecast tracks packaging growth by industry and charts material costs and availability

On the one hand, best-selling crepehanger Ravi Batra says 1990 will mark the start of a seven-year recession. On the other hand, Prudential-Bache Securities' leading optimist Edward Yardeni says we are headed into a long-term global boom. That kind of thing drives pragmatic policymakers to distraction. No wonder President Harry Truman is said to have ordered his aides to find him a money manager who had only one hand.

Economists say they'd give their right arm to know for sure what will happen to the prices of things. They say that because they know they're in no danger of losing a limb.

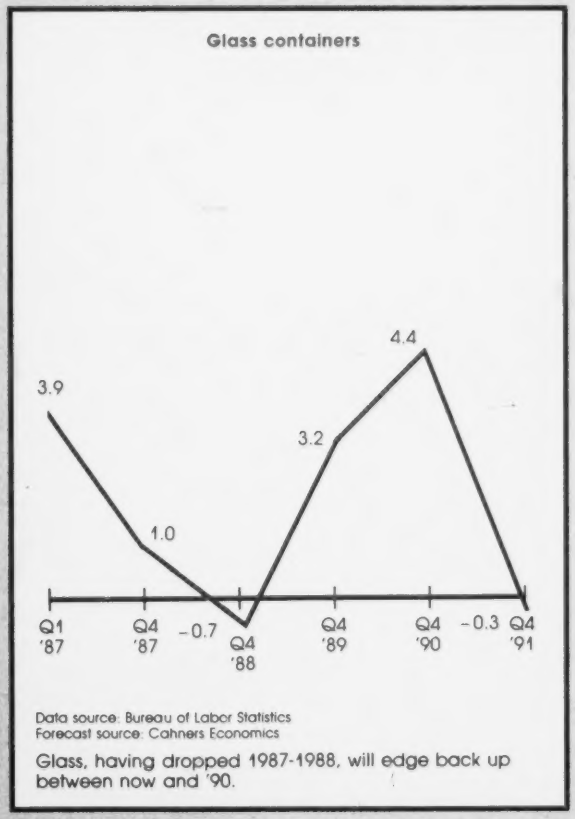
There's no absolute certainty in the pricing predictions you are about to read, but they do seem credible to us . . . at this point. The reason: Manufacturers of packaging materials increased their own spending a while back. That investment boom has led to an inventory glut. Unless demand rises to unexpected heights with unexpected speed over the next 12 months, prices will moderate or even decrease.

The charts representing annual inflation rates for producer prices of fiber and composite cans, fibre drums, and corrugated sheets and rolls—and, to a lesser extent, paper boxes and containers—show wide swings. These can be explained by big changes in capacity within the pulp-and-paper industry. According to Cahners Economics, new investment in plants and equipment in this field rose nearly 26 percent in 1988 and 38 percent in 1989. Cahners predicts a decrease in expansion for 1990—to 13.6 percent—but expansion nonetheless.

As shown by the graphs, that is likely to dampen inflation of pulp-and-paper prices through 1990, offering temporary relief from a period of back-to-back price hikes. (See "Pulp Prices Unsettle Industry," May 1989). Last August, a major supplier of paperboard and corrugated reported lower-than-expected second-quarter earnings in part because its attempt to raise prices still further met strong market opposition.

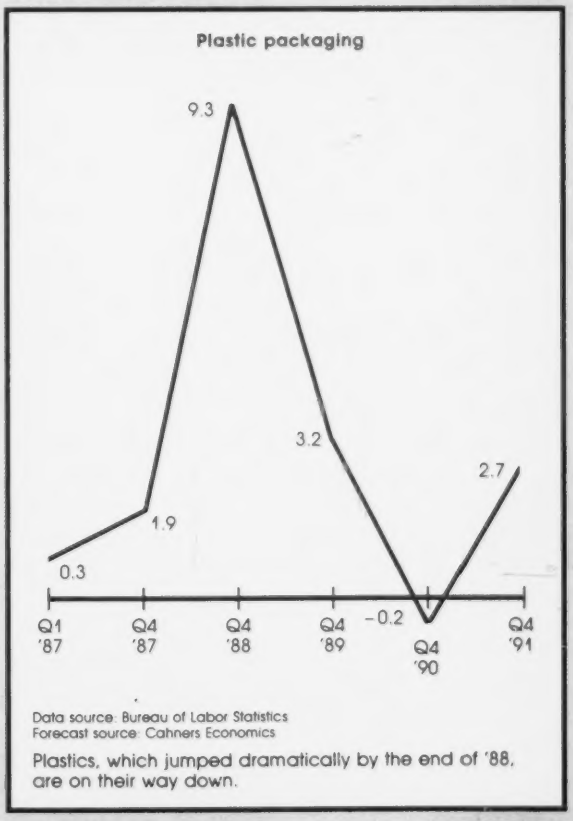
Small increases in glass-capacity investment appear unlikely to favorably affect prices of glass containers before the beginning of 1991. Till then, the rise in price of

ANNUAL INFLATION RATES OF GLASS, PLASTIC PACKAGING TO DROP THROUGH 1990



Data source: Bureau of Labor Statistics
Forecast source: Cahners Economics

Glass, having dropped 1987-1988, will edge back up between now and '90.



Data source: Bureau of Labor Statistics
Forecast source: Cahners Economics

Plastics, which jumped dramatically by the end of '88, are on their way down.

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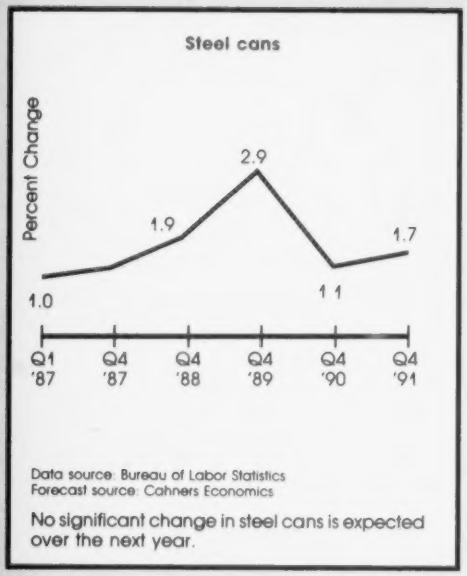
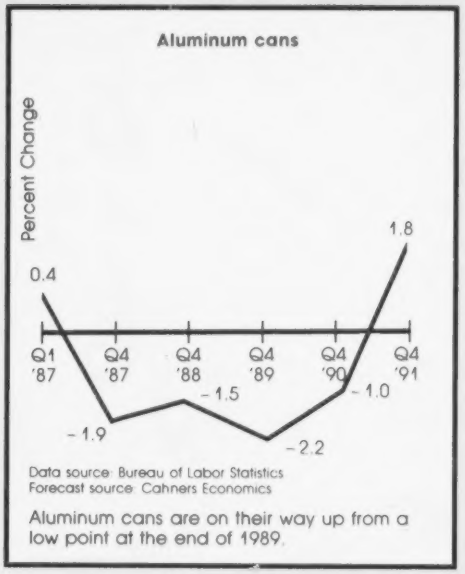
INFLATION RATES FOR ALL BUT ALUMINUM ARE ON THEIR WAY DOWN



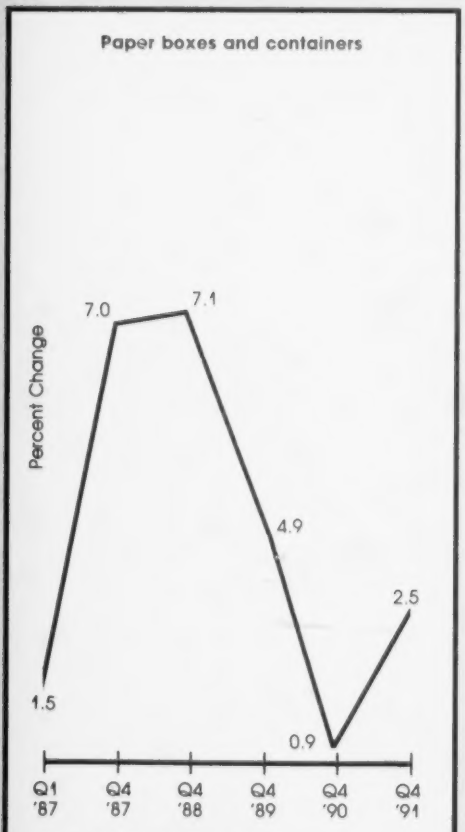
Data source: Bureau of Labor Statistics
Forecast source: Cahners Economics

No significant change in steel cans is expected over the next year.



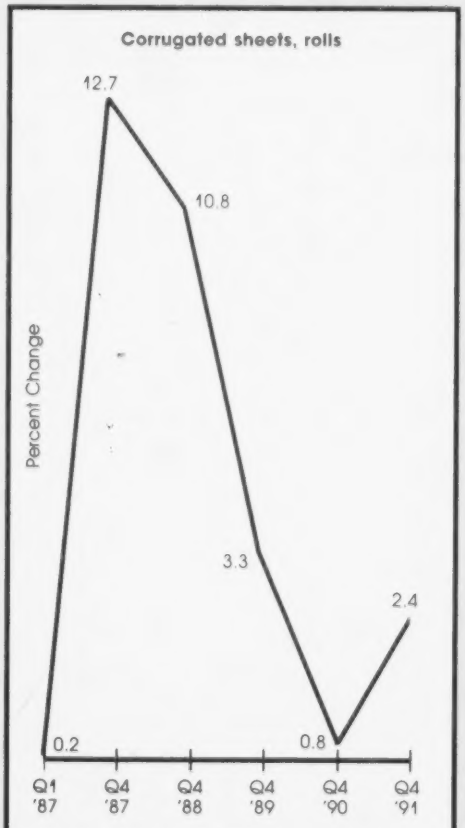
Data source: Bureau of Labor Statistics
Forecast source: Cahners Economics

Aluminum cans are on their way up from a low point at the end of 1989.



Data source: Bureau of Labor Statistics
Forecast source: Cahners Economics

Paper boxes and containers also are falling, headed for a low point one year from now.



Data source: Bureau of Labor Statistics
Forecast source: Cahners Economics

What's true of paper is true of corrugated, which hit a high late in 1987.

An investment boom has led to an inventory glut

glass jars and bottles should continue.

Can-to-can competition

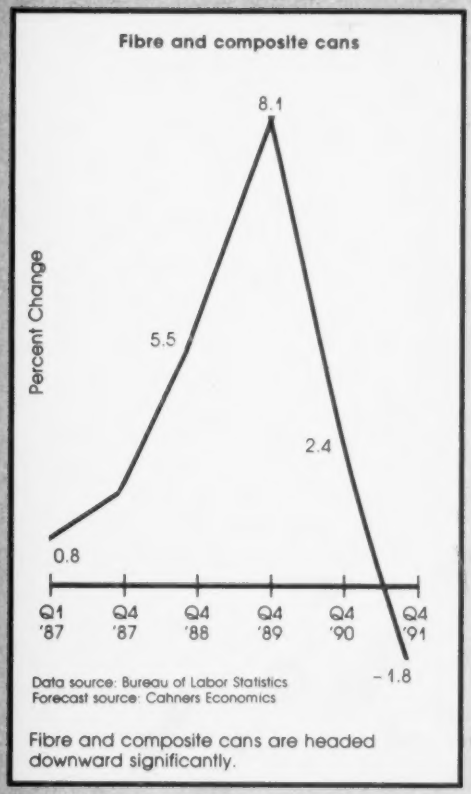
Our figures for the steel-can and aluminum-can business comprise those for all fabricated metal products, of which cans are a relatively small component. The increase in spending for plants and equipment in this area was 7.5 percent in 1988 and 4.0 percent in 1989. For 1990, that will fall to minus 2.1 percent.

Aluminum prices are likely to rise somewhat between now and next winter, and again during 1991. But that may not hurt aluminum as much as you'd think. Presently feeling renewed competition from steel in the beverage market, aluminum may find that its admirable success in post-consumer recycling will enable it to retain market share that it might have lost on the basis of price pressure alone.

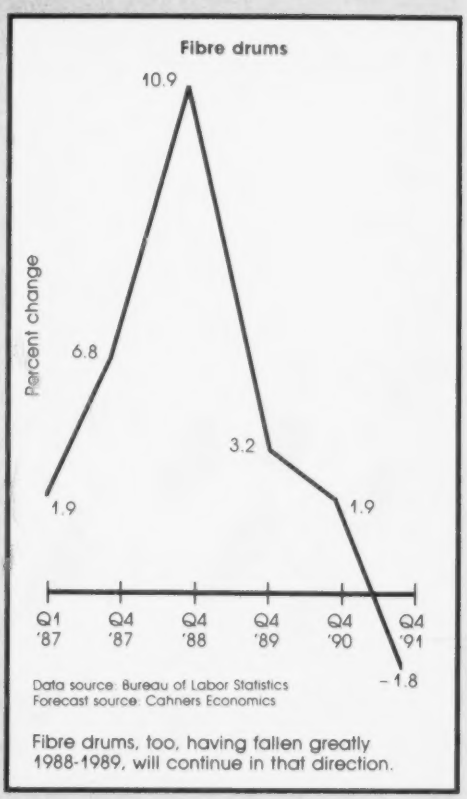
Resin rollercoaster

When it comes to plastic packaging, changes in the inflation rate are easy to explain. As chronicled in these pages last year ("Ethylene Crisis Alarms Packagers," July 1988), numerous factors had combined to drive the price of plastics skyward beginning in the fourth quarter of '86. Back then, producers of the feedstocks saw little reason to construct new plants. In fact, they had intentionally kept some existing facilities idle, waiting for a rise in prices large enough to warrant reopening them. It worked: As demand rose, the price of ethylene, for example, doubled in a matter of months. Prices of resins made from that feedstock rose ac-

FIBRE-BASED PACKAGING CONTINUES TO FALL

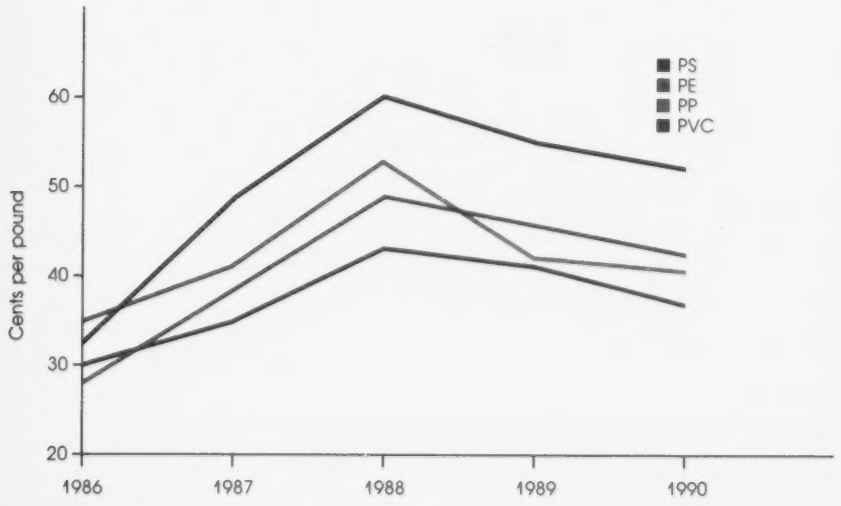


Fibre and composite cans are headed downward significantly.



Fibre drums, too, having fallen greatly 1988-1989, will continue in that direction.

RESIN PRICES HEAD DOWN FROM '88 PEAK



Source: *Plastics World* Magazine

From their highs in 1988, plastic resins are falling in price and are expected to keep falling through next year.

Leadtimes are stable—a sign of moderating prices

cordingly. Others followed.

The fall in value of the U.S. dollar, growing markets at home and overseas, and even ethylene-plant explosions then pushed demand up dramatically. The price-inflation rate of plastic packaging hit 9.3 percent in the fourth quarter of '88.

Between then and now, however, the inflation rate fell to 3.2 percent. It is expected to continue downward through 1990. The reason, as reported by PACKAGING in July '88, is that seemingly all the major players in plastic-resin production suddenly began investing a portion of their higher profits in new capacity. There was an interim period during which the new or formerly idled facilities were coming up to speed. Now they're up, as is supply, and prices are down.

'Boring' leadtimes

A factor of importance equal to that of pricing is availability. Shipment leadtimes for the various packaging materials have not lengthened significantly in recent months. That's a good sign that supply has remained steady.

Shipment leadtimes also provide another means of predicting price changes, since lengthening leadtimes result from diminishing supply relative to demand.

According to PACKAGING's study of materials leadtimes, no big jump in prices is in store, since leadtimes through 1991 are expected to remain right about where they are now. As a source from Cahners Economics puts it, "1990 is going to be a boring year in terms of leadtimes, and that's good."

—Greg Erickson

Packaging Growth Will Slow In 1990

Moderating growth in the key food, beverage and drug industries will slow growth of packaging expenditures

Consumption of packaging will increase 5.5 percent in 1990 to nearly $75 billion.

This is the conclusion reached by the editors of PACKAGING magazine in compiling this first exclusive forecast for the packaging field.

The 5.5 percent growth rate indicates a slowing in growth of packaging consumption following robust gains in 1988 and '89. The primary reasons are a projected slowdown in the growth in value of manufacturing shipments, based on a slowing of the general economy, and stabilization of the prices of many primary packaging materials.

Still, the 5.5 percent gain most likely constitutes real growth in overall packaging consumption. While no statistically reliable deflator for packaging has yet been devised, Cahners Economics forecasts a producer inflation rate of only a little more than three percent in 1990.

And added to the strong gains of the late '80s, the value of packaging consumption has risen by a third since 1985, from $56 billion to a forecast $74.7 billion in 1990.

These estimates of the value of packaging consumption are generated by an exclusive and unique methodology which allows forecasts of packaging growth in the variety of industries that consume packaging materials. The estimates are based on federal Department of Commerce data of the value of manufacturing shipments in the various industries and forecasts of the growth of such shipments by Cahners Economics.

PACKAGING editors then applied different ratios of packaging costs to the value of shipments for each industry, factoring in trends within each industry, changes in the cost of primary materials and other variables.

A crucial element in the slowing growth rate of packaging consumption in 1990 is a slowdown in growth rates in the key food and drug, soaps and toiletries industries.

But "slowdown" must be seen in perspective. These moderate growth rates come on the heels of extremely robust gains in '88 and '89. And in both cases, we project that growth of packaging consumption will outpace actual shipment growth.

Most industrial and consumer goods industries are also forecast to show slower growth in 1990.

Finally, we expect nearly all industries will see renewed strong growth again in 1991.

On the pages that follow, PACKAGING editors analyze the trends and dynamics that are affecting packaging.

—Robin Ashton

PACKAGING FORECAST BY INDUSTRY, 1989-1991

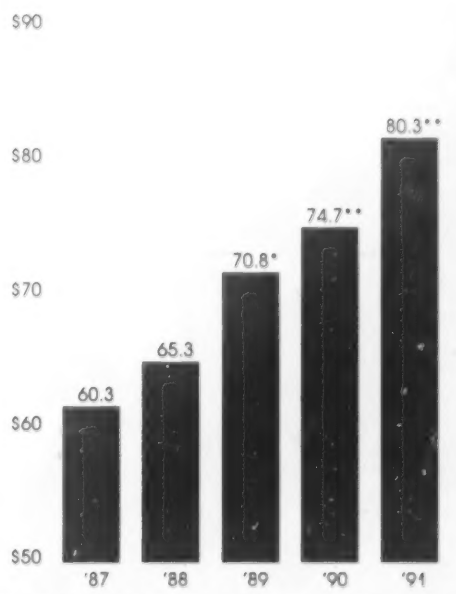
(Value of packaging materials, containers and supplies, $millions)

Industry	'89 Packaging Consumption	Percent Growth	'90 Packaging Consumption	Percent Growth	'91 Packaging Consumption	Percent Growth
Foods	$24,142	8.5%	$25,462	5.5%	$27,535	8.1%
Beverages	$13,520	8.8%	$14,430	6.7%	$15,026	4.1%
Drugs, Soaps & Toiletries	$6,561	12.0%	$6,929	5.6%	$7,528	8.6%
Electrical Machinery	$4,785	5.5%	$4,908	2.6%	$5,392	9.9%
Fabricated Metal Products	$3,260	13.2%	$3,389	4.0%	$3,674	8.4%
Other Chemicals	$2,404	2.3%	$2,610	8.6%	$2,801	7.3%
Non-Electrical Machinery/Computers	$1,638	10.6%	$1,716	4.7%	$1,879	9.5%
Instruments	$1,508	4.0%	$1,556	3.2%	$1,686	8.4%
Tobacco	$720	9.1%	$747	3.8%	$792	6.0%
All Other Industries	$12,296	7.9%	$12,979	5.6%	$13,998	7.8%
TOTAL	$70,834	8.5%	$74,726	5.5%	$80,311	7.5%

Sources: PACKAGING, based on forecasts by Cahners Economics
Data Source: U.S. Dept of Commerce

THE PACKAGING MARKET FORECAST
TOTAL ALL INDUSTRIES
1987 - 1991
($ Billions)

Consumption of packaging materials and supplies will grow by a third 1987-1991.



Sources: PACKAGING, based on forecasts by Cahners Economics. Data source: U.S. Dept. of Commerce

*Projected **Forecast

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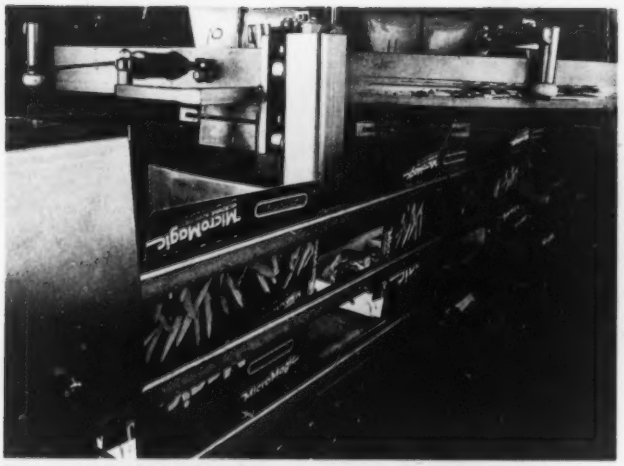
FOODS

($millions)

Year	Consumption	Growth
'87	$20,167	—
'88	$22,241	10.3%
'89	$24,142	8.5%
'90	$25,462	5.5%
'91	$27,535	8.1%



Demand for fresh, 'healthy' foods is having a pronounced effect on packaging. MAP/CAP technologies are expanding for minimally processed prepared foods and produce.

'Fresh And Healthy' Drive Food Packaging

Food packagers take heed. "Convenience" is no longer the dominant buzzword in food product marketing. It's been supplanted by a new word and concept—health.

"Wellness" is the trend of the '90s. Americans are shuddering at their own excesses and are cleaning up their acts as they collectively become older. The result is growing demand for minimally processed or fresh foods with fewer preservatives and extensive ingredient information, trends that will have a pronounced impact on packaging.

Of course, demand for food products in convenient, easy-to-prepare forms continues to drive food packaging development. And a proliferation of techniques that use packaging as the final point-of-sale billboard is also a major trend.

But the growing demand for fresh and healthy foods will lead to strong growth of controlled- and modified-atmosphere and other high-tech packaging technologies if technical and distribution challenges can be overcome.

Trend watchers predict the coming of a "fresh corridor" within the '90s supermarket. It will feature fresh, high-quality foods portioned for microwave reheating, or already hot for immediate consumption.

Microwave experts predict next-to-zero growth in frozen microwavable products in favor of shelf-stable and especially refrigerated products for the ubiquitous appliance. The "fresh corridor" will be buttressed by a produce department filled with branded, convenience-processed fruits and vegetables, many packed using MAP/CAP.

In addition, all packagers of processed foods will provide more nutrient information on labels.

Established brands continue to be updated and enhanced. It's easier and cheaper than developing new brands. This trend, driven by tight shelf space, slotting fees and the fragmenting of mass advertising, has generated new techniques to draw attention to the package. The use of metallized films and foils, brighter graphics, holograms, and in-package games and give-aways is exploding.

Overall, Americans are looking at food in a new way. New packaging techniques and technologies are an essential aspect of this trend.

—Melissa Larson

CONSUMPTION OF MICROWAVE-ONLY MATERIALS, 1989 THROUGH 1994

(in millions of units)

Material	1989	1990	Percent Change	1991	Percent Change	1992	Percent Change	1993	Percent Change	1994	Percent Change	CARG[1]
Popcorn bags	1,400	1,700	21.4%	2,000	17.6%	2,200	10.0%	2,420	10.0%	2,620	8.3%	13.5%
Paperboard cartons with susceptors	300	500	66.6	600	20.0	650	8.3	600	-7.7	600	0.0	14.9%
Rigid containers with susceptors	NA	75	—	200	166.7	350	75.0	500	42.9	700	40.0	74.8%[2]
Multi-layer tubs	200	350	75.0	600	71.4	900	50.0	1,200	33.0	1,500	25.0	49.6%
Multi-layer trays	50	100	100.0	200	100.0	350	75.0	450	28.6	600	33.3	64.4%
Polypropylene containers	200	300	50.0	375	25.0	425	13.3	480	12.9	515	7.3	20.8%
Total	2,150	3,025	40.7%	3,975	31.4%	4,875	22.6%	5,650	15.9%	6,535	15.7%	24.9%

NA: Not available [1]Compound Annual Growth [2]1990-1994

Source: FIND/SVP

Multipacks, New Sizes Lead Beverage Trends

The plethora of new beverages and beverage packaging in the next few years will have to meet a dizzying array of demands from a restless, fickle marketplace.

First and foremost, the Pepsi Generation is getting gray at the temples. To appeal to this tide of aging Baby Boomers will come a wave of "New Age" beverages that competes with the bastions of beer and soft drinks. These newcomers are typically juice-based drinks and bottled waters stealing thunder from the once-popular wine coolers.

Bottled water especially is making its presence felt. With annual sales breaking the $2 billion mark this year, the category may not stand out much against the overall beverage backdrop. But, annual growth rates over 10 percent through 1992 are the stuff of dreams to America's major brewers who have been seeing little or no growth for years now.

Plastic dominates and will continue to gain share as the packaging material of choice for bottled-water packaging. Polycarbonate containers in the 5- to 6-gallon size are the mainstay of the commercial and home-delivery markets. Now, similarly clear containers in PVC and PET are making inroads in retail single-serving and larger sizes.

Growth in the demand for soft drinks remains a bright spot in the beverage picture. Several developments are gaining favor among the Top Five soft-drink bottlers who together spend upwards of $15 million every business day on packaging. Both Pepsi and Coke have introduced 20-ounce, non-returnable glass bottles, often with banners shouting "Four ounces free." Non-traditional selling methods using multipacks are also gaining momentum. The 24-can case has supplanted the 12-can case. Multipacking of four 2-liter PET bottles is also on the horizon. The only question is whether the average shopper can easily carry the 18-pound package.

One packaging supplier summed it up rather succintly, "Marketing dynamics dictate that whatever works well, works." So we may be seeing more 15-can cases labeled "Three more free," or even hexagonal multipacks of up to 36 cans..

Faced with the prospect of fewer new legal consumers of alcohol in the next 15 years, brewers do not hold much hope for any real growth in the foreseeable future. According to one brand manager, growth will have to come from the aging population by getting more citizens over-65 to drink more beer.

New packaging plays an important role in this effort. The wave of longneck glass-bottle introductions begun in 1988 seems to have run its course. The shape appeals to aging Baby Boomers and nostalgic seniors, and at least one brewer has employed crowns that must be removed with a bottle-opener.

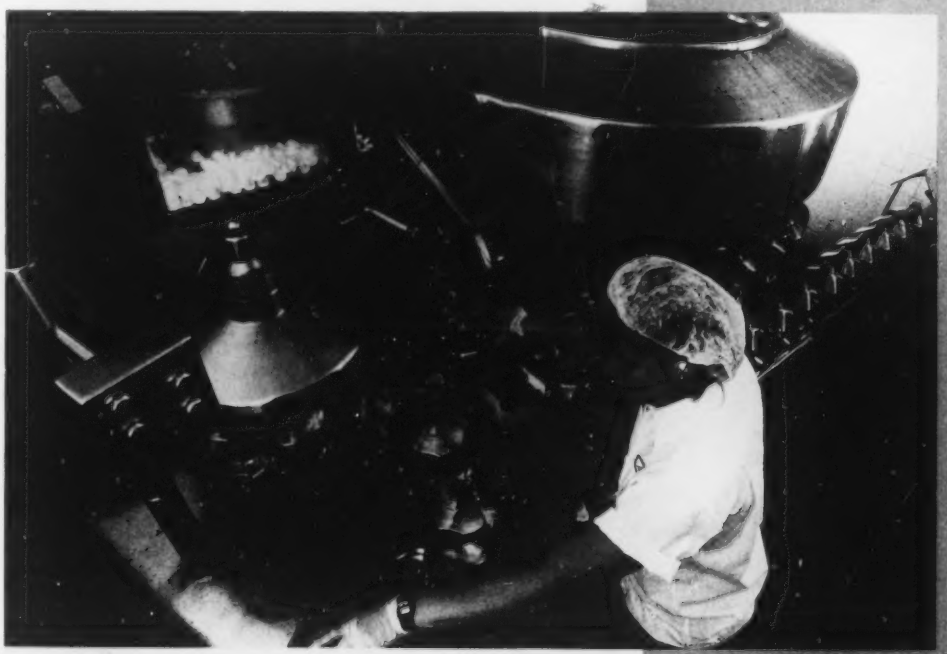
Two categories waiting in the wings are iced coffees and aseptics for the mature market. Long popular overseas, several iced coffees in 8-ounce cans made their debut at the recent Interbev89. Intergenerational marketing may be the answer to getting more Gray Boomers to slurp everything from juices to diet supplements from the multi-layer boxes. Beverage packagers hope grandchildren will set an example for their grandparents to sell them on the convenience of aseptic containers.

— Mark Spaulding

BEVERAGES

($millions)

Year	Consumption	Growth
'87	$11,674	—
'88	$12,428	6.5%
'89	$13,520	8.8%
'90	$14,430	6.7%
'91	$15,026	4.1%



Clear plastic bottles zip through a modern, bottled-water packaging line.

Graphic design plays an increasingly important role as tobacco companies tailor brand styles to individual consumer preferences.

TOBACCO

($millions)

Year	Consumption	Growth
'87	$591	—
'88	$660	1.2%
'89	$720	9.1%
'90	$747	3.8%
'91	$792	6.0%

Tobacco Companies Fight Back With 'Style'

Like Rocky Balboa, tobacco companies can take a punch and keep on standing. Even in the midst of declining markets and negative publicity, tobacco giants are fighting back. New products, extensions of major brands and redesigns to update an existing product's image are key to their strategy.

Since 1981 domestic sales have declined 11 percent; a 1 to 2 percent decline per year, but the decline is slowing. On the up side, exports have risen 36 percent since 1981, especially in Asian markets, since the loosening of trade barriers.

To compete for market share among the dwindling number of current smokers, companies have been tailoring brand styles to particular types of smokers. In 1980, 176 brand styles of cigarettes were available. As of July 1989, the figure increased 52 percent to 339 brand styles.

Because females are smoking more than ever (approximately 60 percent of all smokers are female), many brand styles are now specifically designed to capture their attention with feminine upscale, contemporary package designs.

A growing trend is in the savings segment: Premium quality products at a lower price account for 15 percent of the total market. While the profit margin is not as high as the major brands, volume is. According to Dave Isbister, senior vice president, Technology, Leaf, Packaging & Tobacco Processing at R.J. Reynolds Tobacco Co., consumers will decide what the industry will do here, but this segment is definitely on the rise.

Various types of alternate packages have been tried over the years. To date, none of them have been big sellers. Soft and hard packs have become standard in the industry because that is what existing packaging equipment is set up to handle.

Although more expensive to produce, hard packs have found a niche—55 percent of the 18- to 20-year old group prefer them. This trend relates to life and dress styles: Boxes provide additional product protection when carried in the pocket of jeans.

Recent improvements in inks and in printing technology have contributed to the industry's high graphics standard. Watch for a movement toward water-based inks in the future because of EPA demands, notes David Scarlet, partner at Peterson & Blyth, the design firm for American Tobacco.

Companies are spending more to produce quality packaging to enhance the image of their products. R.J.R.'s Isbister explains, "We look even more carefully today at the material costs and the material *tradeoffs*." He adds, "A certain graphics design may be less expensive to print, but might not be what the consumer wants. The extra cost is absolutely justified."

In the early '80s, most plants installed improved packaging equipment. Packaging speed doubled from 200 packs a minute in 1980 to the current speed of 400 packs a minute. Faster packaging speeds dictate demanding tight tolerances in materials, such as precise cutting of carton blanks for hard packs and improved uniformity of paper wrappers for soft packs. Crucial to controlling tolerances are quality partnerships between tobacco companies and their suppliers.

As in any industry, the goal is to make the best possible package at the lowest possible cost. Further improvements in graphics and a continued increase in packaging speeds are the tobacco industry's strong one-two punch.

—Lisa McTigue Pierce

Pharmaceuticals Get An O-T-C Facelift

DRUGS, SOAPS & TOILETRIES

($millions)

Year	Consumption	Growth
'87	$5,360	—
'88	$5,856	9.3%
'89	$6,561	12.0%
'90	$6,929	5.6%
'91	$7,528	8.6%

For fast, fast, fast relief of symptoms due to the common cold, nine out of 10 consumers spell "remedy" D-I-Y. Increasingly, consumers are avoiding both doctor and druggist . . . and working at curing their ailments all by themselves. This trend appears likely to remain strong while the FDA goes on approving formerly prescription-only pharmaceuticals for sale over the counter.

Overall, production of drugs and medicines grew at an amazingly strong 9.4 percent in 1988. The increase in production slowed to 3.2 percent in 1989. However, Cahners Economics says production will accelerate to 6.6 percent in 1990 and rise by 7.1 percent in '91. One consultant to the pharmaceuticals industry says he foresees sales of O-T-C drugs hitting the $30 billion mark by 2000.

Who are the consumers of all these O-T-C drugs? Some are elderly, and their number is rising. But baby boomers represent a larger market. They are growing old rambunctiously . . . but not without feeling a bit sore or rundown every now and then. They're affluent enough to pay for an office visit but don't have the time to go.

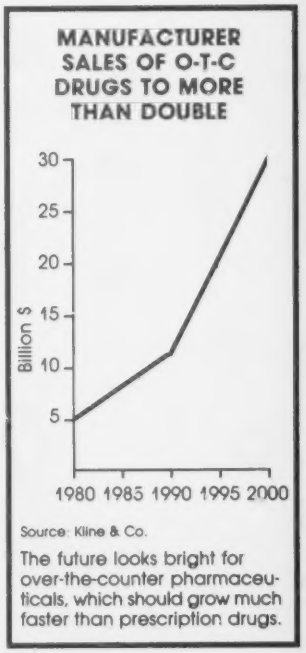
How will all these demographic factors affect the field of pharmaceuticals packaging? For one thing, hot O-T-C competition will require even the most conservative drug companies to develop packages that are snazzy and consumer-grabbing.

Convenience, too, will command attention: Some existing closures, notably child-resistant types, are already unpopular with older consumers. New methods of increasing the ease of opening, dispensing and closing drug containers while helping ensure tamper resistance and child resistance will no doubt be introduced.

Also affecting the packaging of drugs is the FDA's continuing investigation into mislabeling. Among other recommendations, the FDA has suggested that pharmaceuticals companies reduce recalls by switching from cut labels to roll labels and by installing electronic inspection systems.

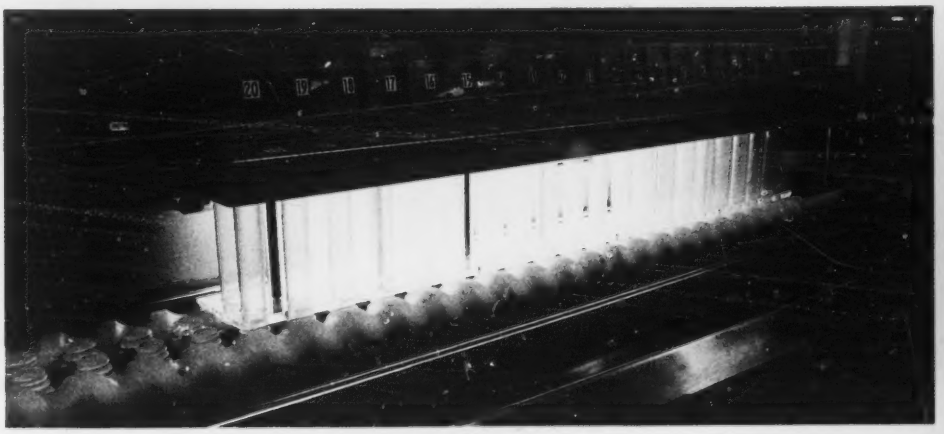
Use of blisters is growing among makers of prescription drugs—especially for physician's samples and compliance packages. However, any large-scale move from bottles to bubbles probably will face opposition from elderly consumers, who say fumbling with blister packages makes them feel older than they really are.

—Greg Erickson



The future looks bright for over-the-counter pharmaceuticals, which should grow much faster than prescription drugs.

Moving out into the O-T-C spotlight, pharmaceuticals will need new packaging to fight the shelf-presence war.



HOUSEHOLD CHEMICALS

Environmental Concerns Are The Cleaner Trend

Packaging for household cleaning products has been influenced, perhaps more than any other retail segment, by environmental concerns.

Category giant Procter & Gamble got the ball rolling by announcing it was using recycled PET resin for some of its packaging. The European and Japanese practice of packaging superconcentrated refills of cleaning products may catch on here, too (the consumer mixes the superconcentrate with water in the original package).

Super-concentrated detergent powders in compact packages will begin hitting store shelves here in the next 12 months, as domestic soap giants respond to competition from Japanese products such as Attack.

The experimentation with super-concentrated products has added elements. Merchandising analysts note that the smaller packages will open cramped shelf space for more products. And widescale acceptance of superconcentrates should reduce overall packaging costs.

Meanwhile, all-in-one "convenience" detergent/softener products, such as Fab 1-Shot, have not done well. The packaging may be ingenious, but the cleaning performance has not been up to consumers' expectations. Industry analysts suggest shoppers prefer separate cleaning and conditioning products, well-packaged, that perform brilliantly.

The jury is still out on Dowbrands' Spiffits, the cleaner-and-towel in one. Similar products, such as Scott Paper's Once Overs, have been withdrawn from test-market. Packagers may be realizing that convenience is not the only reason consumers accept a new cleaning product.

While liquid detergents for automatic dishwashers have grabbed substantial market share from powders, powdered laundry detergent introductions appear to have dreversed the wide-spread conversion to liquids.

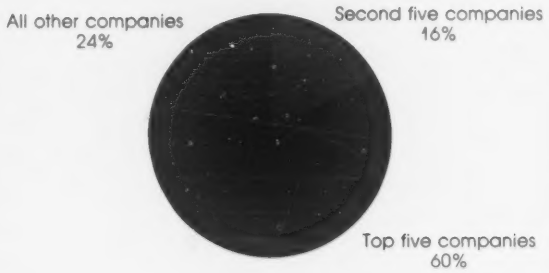
The new powder products are not all packaged in a paperboard box. Several powder detergents, softeners and bleaches have appeared in clear plastic bottles. The plastic container will probably continue to be the dominant package for this type of product.

Decorating trends for plastic bottles continue to favor fluorescent colors, in-mold labels and even more banners touting the products' fragrance-free, new-and-improved claims. Self-draining spouts are proliferating. And multiple sizes, from super-jumbo on down, will no doubt continue to be offered as marketers strive to provide a size for every demographic group.

The segment will continue to represent an active market for new closures, as dispensing devices from pump triggers to large-orifice closures for squeeze bottles top off the latest product entries.

—Melissa Larson

U.S. SALES OF HOUSEHOLD CLEANING PRODUCTS BY COMPANY



Total U.S. Sales of Household Cleaning Products $9.2 billion

This chart shows the dominance of the U.S. houshold cleaning products segment by the top five soap "Giants." However, even these megamarketers need to watch the Japanese in the coming year.

Source: Kline & Co., Inc.

Packagers Polish Mass-Market Cosmetics

In an aging, increasingly affluent market of shoppers with more money than time, mass-market cosmetics, toiletries and fragrances are looking the part.

Supermarket aisles are ablaze with pearlescent bottles and tubes. Therapeutic home hair-care regimens—including those for men with thinning hair—try to horn in on salon product sales. Slick tubes of skin gels and makeup are targeted at working women too busy for a department-store makeover. And the air is filled with the competing scents of mass-market fragrances.

Glitzy packaging is a big part of the sell. And the lion's share of current personal-care packaging is plastic. Neon-colored closures, outer cartons, pearl pigment effects, and high-performance labeling grab the eye and add an aura of value to the product. These are a few of the reasons why packaging sales in this hot segment are growing at a healthy 6.3 percent clip, according to research firm Frost & Sullivan.

Men are no longer shy about taking care of their skin and hair, and products for them are proliferating. Clean design and decoration suggest a "scientific" formulation which appeals to males, especially those with balding pates.

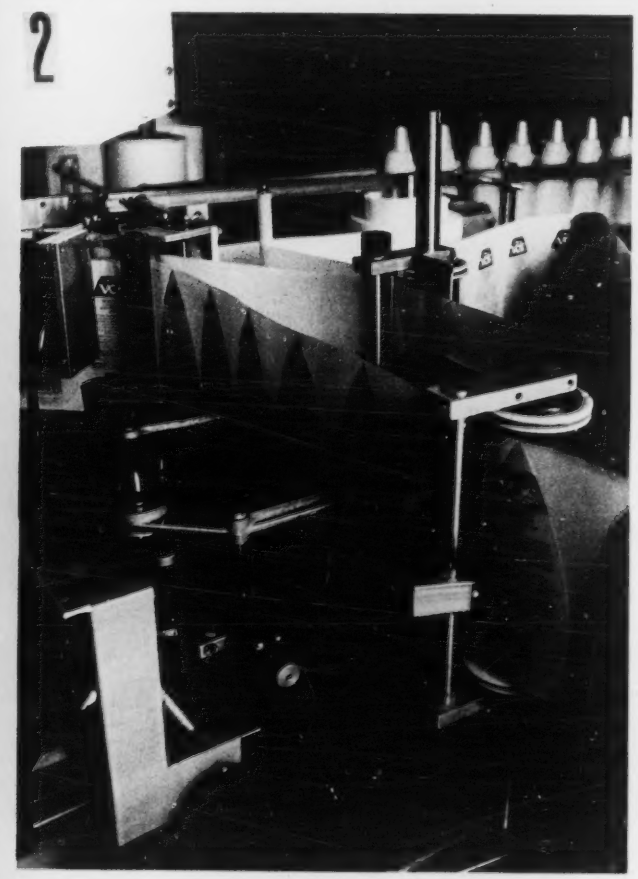
Hair-care products are also proliferating for the over-40 set, as marketers draw the obvious conclusion from demographic trends. Gains in products for mature Americans may help offset a decline in sales of mousses and gels sparked by the teenage "big hair" boom.

Packagers and their suppliers have worked wonders with the plastic bottle and tube. Clear hair and skin products appear in see-through plastic bottles decorated with clear labels.

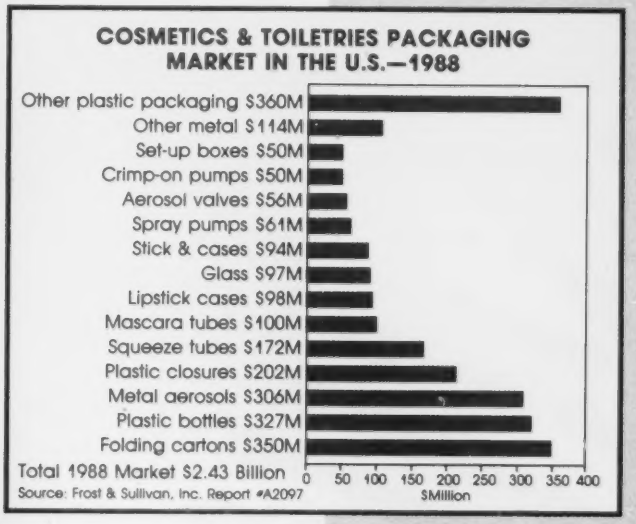
Tubes can rest upside-down on the closure, and can be decorated with high-performance pressure-sensitive labels as well as direct printing. Cut-out cartons reveal the product within while adding "weight" and more room for product claims. And fragrance and sun-care items have appeared in everything from banana-shaped tubes to key chains.

Look for increased attention on closures, labels and stock but expensive-looking bottles, tubes and jars in this segment, where the package is a crucial sales tool.

—Melissa Larson



Beautiful decorating is a must for personal-care products—but labels must stand up to repeated use.



COSMETICS

Chemical Packagers Await Clear Standards

"A state of suspension," is how one packager of specialty chemicals describes the current climate.

While many industrial and specialty chemical makers are looking to upgrade their packaging, uncertainty regarding the final disposition of a host of regulations and standards keeps them guessing.

In the wider world—and chemical production is a global business—new standards are due from the United Nations and from a European Economic Community preparing for 1992. The U.N. standards are scheduled to go into effect Jan. 1, 1991.The new European standards are expected sooner, by March 1990.

In the U.S., meeting these new standards is creating uncertainty and confusion, mostly because the federal Department of Transportation is having trouble getting new DOT standards that match the tougher international standards through Congress.

According to Van Doren F. Douglass, manager of regulatory services for J.T. Baker, Inc., a maker of specialty chemicals based in Phillipsburg, N.J., chemical packagers anticipate they will have to meet tougher drop-height requirements, which in Europe and the U.N. codifications are based on tougher performance standards. But the phrasing and timing of new DOT regulations remains unclear, making planning almost impossible.

Suppliers of standard containers such as drums are presently meeting the tougher standards as they are now known, but users and suppliers of combination packaging face many unresolved questions.

These uncertainties come at a time when many chemical makers are gearing up for what should be a healthy two years.

Following robust growth in '87 and '88, shipments growth dropped back in '89 to only 2.3 percent. But with the economy expected to begin an upward swing next year, Cahners Economics expects industrial chemical shipments to rise 8.6 percent in '90 and an additional 7.3 percent in '91. Our forecasts of packaging consumption, a substantial $2.6 billion in '90, mirror these growth rates. But in the longer run, tougher standards worldwide can be expected to raise packaging costs. Some analysts believe the new standards could drive chemical packaging costs 25-50 percent higher in the next few years.

Meeting new, tougher packaging standards are not the only challenges chemical makers face. The wide-ranging implementation of statistical process controls in many manufacturing industries, an element of the larger drive for higher quality, has placed new demands on fill-weight and volume tolerances.

Since many chemical products become ingredients of a "recipe" for other products, chemical buyers are demanding that 50 pounds be 50 pounds, leading to increased investment in checkweighers and volume-filling control devices. Such quality demands will only expand in the future.

—Bruce Holmgren and Robin Ashton

OTHER CHEMICALS

($millions)

Year	Consumption	Growth
'87	$2,189	—
'88	$2,351	7.4%
'89	$2,404	2.3%
'90	$2,610	8.6%
'91	$2,801	7.3%

Uncertainty about pending standards and demands for more accurate packaging are among the challenges currently facing industrial chemical packagers.

Clear Growth Ahead For Hardware

FABRICATED METAL PRODUCTS

($millions)

Year	Consumption	Growth
'87	$2,700	—
'88	$2,880	6.7%
'89	$3,260	13.2%
'90	$3,389	4.0%
'91	$3,674	8.4%

The dimly lighted old hardware store with the creaky wood floor and the cobwebs has given way to a dazzlingly bright home center with aisles three shopping carts wide. Rotating bins full of nails and screws have gone the way of the pickle barrel. Today, practically everything in the home center is packaged. You don't grab up seven wing nuts; you buy two packages of six each. And the avuncular jack-of-all-trades hardware-store proprietor who used to cheerfully explain the difference between molly bolts and toggle bolts has retired. These days it's the package that does the instructing and selling.

According to a study prepared by Cahners Economics for readers of the Cahners magazine *Building Supply Home Centers*, all this has boosted convenience for the consumer: "Products packaged with simple instructions continue to bolster healthy D-I-Y sales," says Cahners. Consumers increasingly assume they can do the desired remodeling or repair job themselves, in part because informative packaging makes the job look easy.

Packaging has also boosted convenience for retailers, who realize that accurate inventorying is a must. Bar coding has become crucial, but it's tough to put a bar code on a single drill bit.

Increasingly, the packaging of choice for hardware items—everything from a few lock washers to a complete soldering gun set—is made of clear plastic, which gives shoppers a chance to examine the product without opening the package. Transparent blisters, clamshells and skin packaging are rapidly replacing opaque cartons and cases.

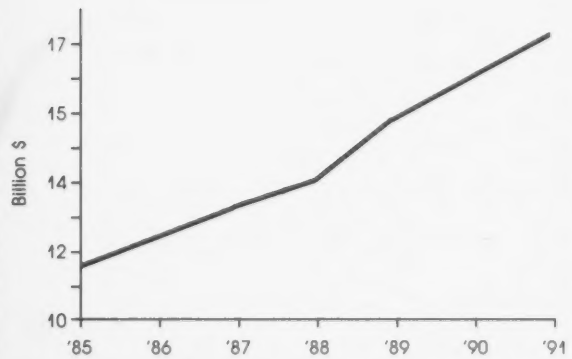
Carl Perry, manager of corporate purchasing for Vermont American, the world's largest manufacturer of cutting tools for the retail market, says, "I have 10 to 15 projects on my desk right now that are moving from other kinds of packaging into PVC blisters."

Even some remarkably heavy items are now peggable thanks to their plastic packaging. Others, because they're too big or weighty, are still packaged in paperboard or corrugated. Those cartons, like the transparent packages displayed nearby, must convey a wealth of information. Again, the disapearing sales clerk is the reason.

Cahners Economics foresees the market for home-improvement materials remaining strong, no matter what happens to the economy short-term. "In good times," says the report, "people have money to spend; in bad, they take on projects to enhance their home's value . . . ."

—Greg Erickson

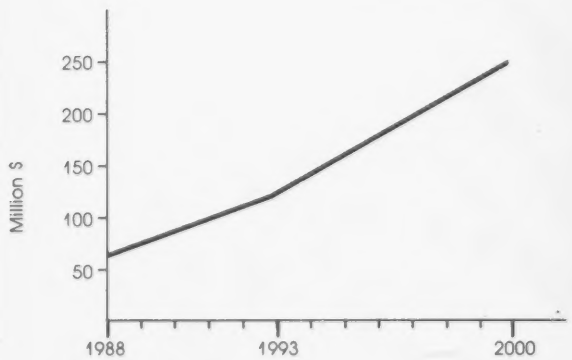
HARDWARE-STORE SALES TO CONTINUE CLIMBING



Data source: Commerce Dept.
Forecast Source: Cahners Economics

Packaging can take some credit for the continued growth in hardware sales, since it boosts convenience and communication with the consumer.

SALES OF 'VISIBLE' PACKAGING FOR HARDWARE TO QUADRUPLE BY 2000



Source: The Freedonia Group

Sales of blisters, clamshells and skin packaging for hardware products will nearly double 1988-1993 and double again by the year 2000.

Ultra-Safe Packaging Grows For High-Value Electronics

NON-ELECTRICAL MACHINERY/ COMPUTERS

($millions)

Year	Consumption	Growth
'87	$1,300	—
'88	$1,481	13.9%
'89	$1,638	10.6%
'90	$1,716	4.7%
'91	$1,879	9.5%

A combination of fire-retardant corrugated cases and combustion-modified cushioning will become standard packaging equipment for the computers and electronic office equipment of the '90s.

Look at the serious fire risks involved in a modern computer warehouse. The high value of computer hardware, typewriters, faxes and other electronics translates into hundreds of millions of dollars in risk exposure for a typical high-density warehouse. Values can easily reach $3,000 per square foot.

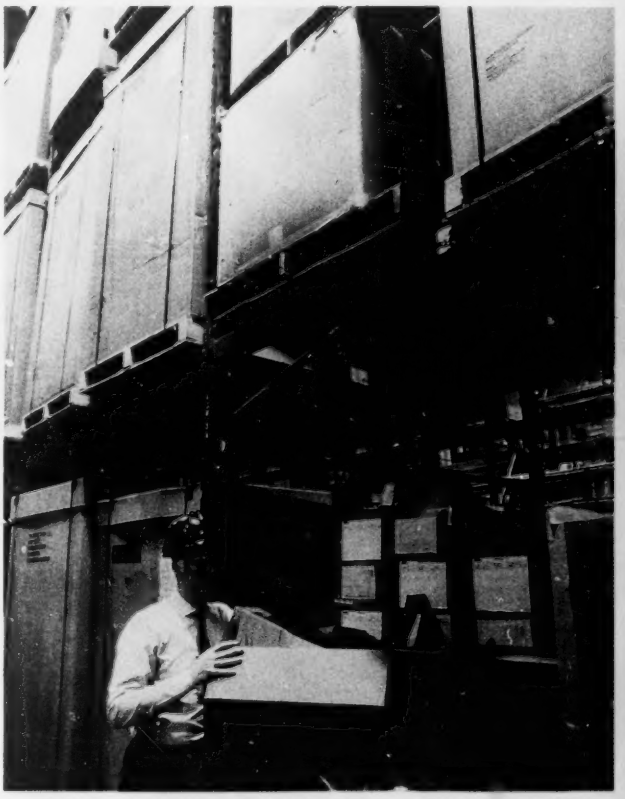
Escalating insurance premiums up to $1 for every $100 worth of product has packagers scrambling to come up with ultra-safe containers for these products in storage and transport. In addition, growing competition in the industry puts pressure on electronics manufacturers to cut costs wherever possible.

Enter fire-retardant packaging. It offers users three ways to save money. A perceived reduction in fire risk tends to drop insurance premiums, and consequently, companies may avoid the cost of upgrading a warehouse's sprinkler systems. And in the event of a fire, actual damage is minimized.

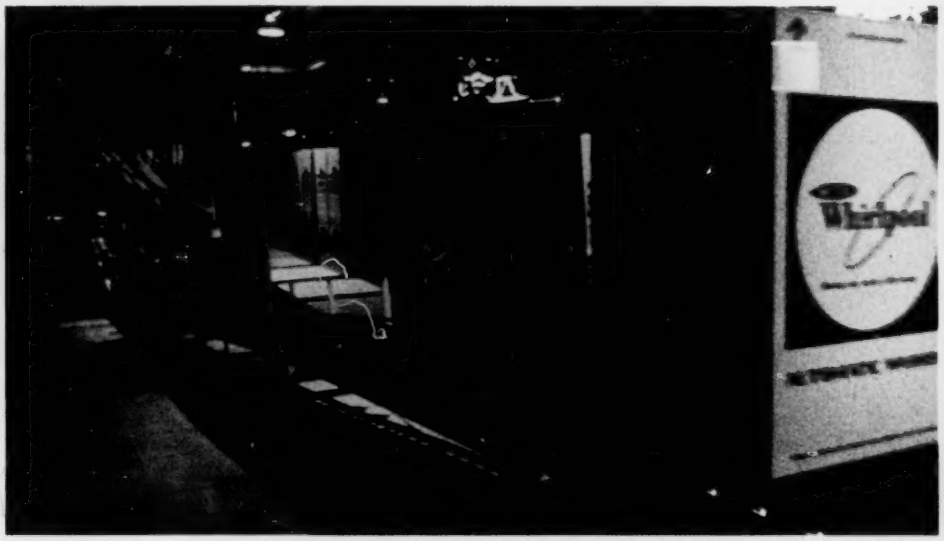
But all the ultra-safe packaging in the world wouldn't help much if it didn't also protect and cushion the product properly. That's where the developments of the past few years are coming into play. Fire-retardant bubble wraps and combustion-modified foam-in-place systems are making strong headway in the electronics-packaging market. These materials have now reached a stage where they can offer users performance equal to regular cushioning, as well as the benefits of a lower fire risk.

The burgeoning home-electronics industry, expected to broach $40 billion come 1993, has some wild gadgets up its sleeve. Mini-cellular phones, high-definition TVs and a wide variety of remote controls for home automation await the consumers of tomorrow. Getting these products to an anxious market safely and in good condition will become even more important in such a highly-competitive field. Ultra-safe packaging will move from being an important part of the overall product distribution cycle to a crucial factor in a manufacturer's ability to compete in the marketplace.

—Mark Spaulding



Fire-retardant cases and cushioning will play an increasingly important role in protecting computers and office electronics in the warehouse of the '90s.



Packaging for major appliances doesn't have to look good, it just has to protect the product.

ELECTRICAL MACHINERY

($millions)

Year	Consumption	Growth
'87	$4,208	—
'88	$4,534	7.7%
'89	$4,785	5.5%
'90	$4,908	2.6%
'91	$5,392	9.9%

Major Appliances Look For Less Material

You would expect a big product to have a big package, right? Wrong. According to Brian Gallagher, senior packaging engineer at the St. Joseph Technology Center of Whirlpool Corp., bigger does not necessarily mean more. Rising prices and the solid-waste issue are motivating manufacturers of major household appliances to use less packaging.

Corrugated continues to be the widest-used packaging material, but that could be changing. Recent increases in corrugated prices goaded companies to find alternate materials. Whirlpool, for one, switched from corrugated to expanded polystyrene to package its Thin Twin laundry product, an all-in-one washer/dryer unit. Consequently, the company cut the number of packaging components from 29 to 12—a 41 percent reduction. Whirlpool reduced packaging costs by 14 percent and improved the performance of the package.

Cost pressures will continue, according to Gallagher. "Indications are for *all* materials to continue to increase in price. It will be more critical for packaging engineers to be able to evaluate where the costs are best used: in the product, or in the package," Gallagher adds. "Common sense says put it into the product, but sometimes our product and package evaluations disagree with that approach."

Increased product protection along with decreased material usage is one reason high-performance corrugated continues to hold its own. (See State-of-the-Art article on high-performance corrugated elsewhere in this issue.) Gallagher sees an effort in the industry to reduce the thickness of the liners and still maintain stacking strength. In addition to cutting waste, this allows companies to use less warehouse space.

Gallagher says that he also believes solid-waste legislation will influence future trends. Corrugated is recyclable, but the underlying need is to reduce the *amount* of packaging no matter what material is used.

For smaller household appliances, eye-catching four-color graphics provide the point-of-purchase appeal needed for shelf displays. Tom Kieckhafer, president of Westbend's Housewares Div., notes, "Packaging and how we package our products is extremely important to the success of our business. We rely on four-color graphic presentation of our products." He adds, "Even with actual product display, the consumer will read the box for features. In-use pictures printed on the box help complete the retail sale ."

Pre-printed linerboard does provide the vivid colors that retailers prefer. But according to Kieckhafer, it's more cost effective in the U.S. to use a one-color box (preferably a bleached white carton) and four-color printed litho labels on one, two or three sides of the case for the same billboard effect.

—Lisa McTigue Pierce

Complex Needs Challenge Medical Packaging

INSTRUMENTS

($millions)

Year	Consumption	Growth
'87	$1,334	—
'88	$1,450	8.7%
'89	$1,508	4.0%
'90	$1,556	3.2%
'91	$1,686	8.4%

Packaging continues to play a prominent role in the way medical, dental and surgical products are produced, sold and used.

The shift to diagnosis-related groups (DRG's) and greater product accountability for the purposes of insurance coverage have already changed the way hospitals use medical devices and supplies, from surgeon's gloves to disposable scalpels.

In the 1990s the emphasis will continue to be on disposability and ease of use—peelable lidstock on plastic trays, packaging which can be sterilized in a number of ways, and bar-coded labels to facilitate patient accounting.

However, packaging of medical devices is being affected even more by the shift in where various tests and procedures are performed—and by whom.

Not only are more tests being performed than ever before, given the increase in drug-abuse screening policies, AIDS testing and the emergence of home diagnostic kits, but many test kits are now designed for on-the-spot use.

Large hospitals and laboratories are focusing on complicated testing requiring skill in procedure and interpretation, and are leaving routine screening tests to doctors and small labs.

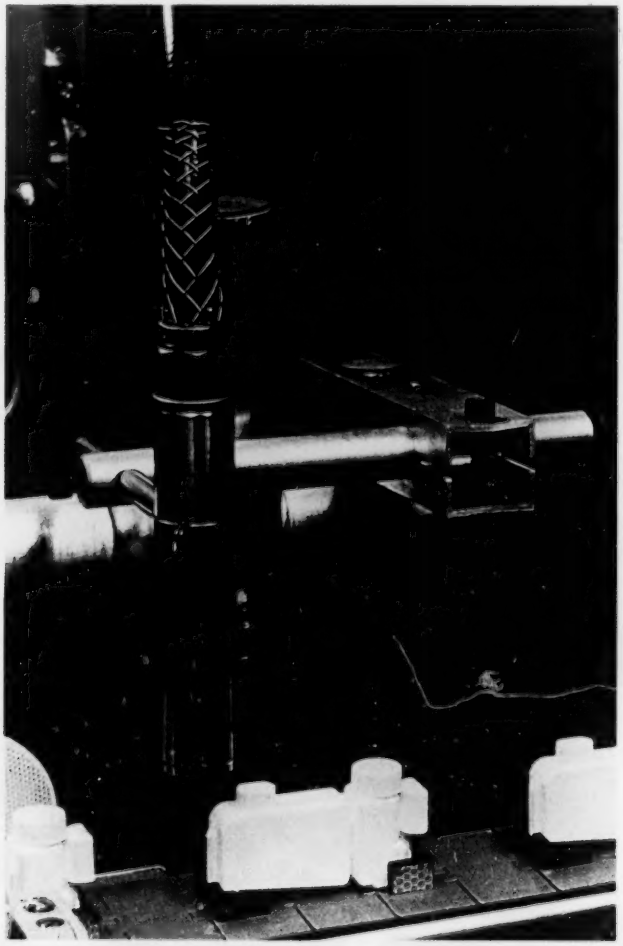
This trend, along with the success of home tests for pregnancy, ovulation, blood sugar and the like, have focused packager attention on making the kits user-friendly. Packaging of these simpler tests often plays an integral role in simplifying analysis, as well as making them easily portable and disposable.

The most popular package for most medical devices remains the thermoformed plastic tray with peelable, printed lidstock. This basic package is economical and easy to identify, sterilize, use and dispose of.

Several formulations of "medical grade" plastics have application in this field, including PVC, polypropylene, polyester, polystyrene and some polycarbonates. Glass appears to be on a steady decline.

Lidstock and pouch constructions could undergo rapid change in the near future as packagers try various combinations of plastic films, foils and papers. Any attempt to unseat the current lidstock material leader, spun-bonded polyolefin, will need to offer low price and high performance to make a mark in the highly-competitive medical market.

—Melissa Larson



Diagnostic reagent cartridge containers are ink-jet printed with contents.

13 Other Industries Buy $13B Of Packaging

OTHER

($millions)

Year	Consumption	Growth
'87	$10,743	—
'88	$11,392	6.0%
'89	$12,296	7.9%
'90	$12,979	5.6%
'91	$13,998	7.8%

It may be scattered, but it adds up to a lot of packaging. While nine industries, from food to scientific and medical instruments, will spend more than $60 billion on packaging, the remaining 13 industries can not be ignored.

Primary materials industries, such as paper, petroleum, rubber, metals, stone, ceramics and glass, and consumer goods manufacturers including apparel, furniture, shoes and other leather goods, sporting goods and toys, collectively will spend nearly $13 billion for packaging in 1990.

Overall, we expect packaging purchases in these 13 industries to grow 5.6 percent in 1990, though the individual growth rates of the different industries vary widely.

Cahners Economics is forecasting slow growth for most primary materials industries, except primary metals.

Our estimates of packaging consumption growth range from a low of 1.8 percent for rubber and miscellaneous plastic products to 8.9 percent for primary metals. Most primary materials packaging growth rates are in the two to four percent range.

One basic material industry that is seeing rather dramatic changes in packaging dynamics is petroleum.

James D. Jones, plant manager, Valvoline Oil Co., Cincinnati, says his industry is seeing a decline in sales of motor oil in quart bottles, "because of the growth of quick-lube franchises." Such establishments receive oil in 500-gallon quantities, directly from tanker trucks.

Jones also foresees the quick-lube phenomenon spurring a move toward returning used oil to refiners for reprocessing or disposal.

At the same time, he speculates that consumers who change their own oil will use refillable containers and return used oil to a service station or other outlet for reprocessing.

These environmental issues are key, in the long run, Jones says, and he even believes it possible resin manufacturers will come up with a material that could melt in with the oil, consuming the package as the product is used.

Some consumer products included in this diverse "Other" category are showing good growth rates, including several that are very packaging intensive.

Growth in spending for toys and games has been strong, fueled by the so-called "Baby Boomlet," the birth-rate increase brought on as the Baby Boom population bubble reaches prime child-bearing years. The growing domination of warehouse toy chains in this market has also raised packaging costs, as rackability and eye-catching graphics become critical merchandising needs.

The sporting goods industry has benefitted from continuing consumer interest in fitness. Here again, chain specialty stores have put a premium on packaging that can help explain and sell the product, increasing packaging costs.

Printing and publishing industries, while not very packaging intensive, have seen strong shipment gains recently, and are forecast to hold their own again in 1990.

Several key consumer goods segments can anticipate a slow year in 1990. The furniture industry has been hurt by the slowdown in new home and office construction. According to Cahners Senior Economist Kim Kennedy, who tracks the furnishings industry for Cahners publications such as *Interior Design* and *Furniture/Today*, growth in sales of business and institutional furnishings was a paltry 2.6 percent in 1989; residential furnishings showed a sales gain of 2.8 percent. Kennedy anticipates continued slowness in 1990.

Despite the slowdown, packaging's profile in the furniture industry is rising, as firms recognize the critical role protection during shipment plays in overall product quality.

"We're seeing more task forces, more interdisciplinary efforts, more breadth of participation throughout the company in packaging-related decision-making," says Thomas J. Lowery, manager, Packaging Laboratory, Ethan Allen Inc., Danbury, Conn.

Lowery believes "the packaging materials are destined to remain the same, but their use and selection are becoming more sophisticated, with emphasis on performance standards rather than mere material standards to predict packaging performance." With more CAD/CAM being employed in furniture design and manufacturing, packaging is being built into the basic design of the product.

—Bruce Holmgren and Robin Ashton

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How would you rate this article? To reply, circle the appropriate number on the reader service card:

Outstanding	480
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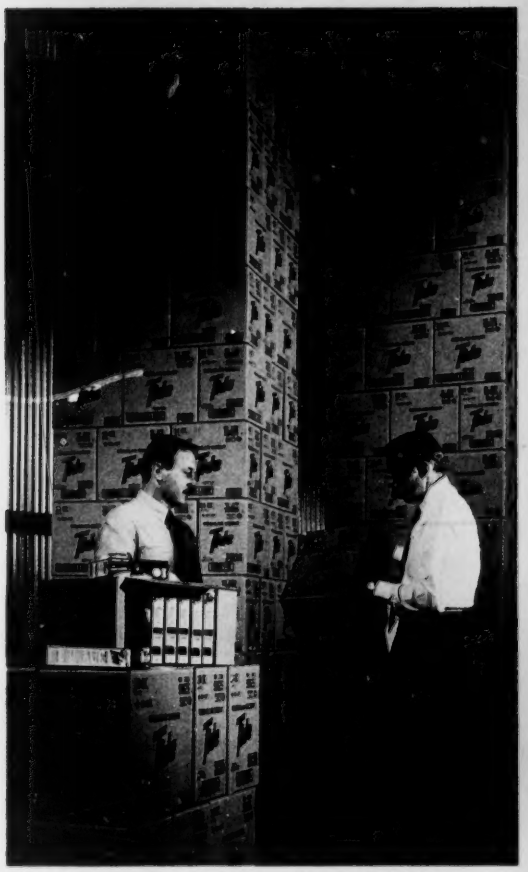
Average	482
Below Average	483

Packagers Profit from High-Performance Corrugated

Whether you box motor oil or strawberries, the latest advances in high-strength shippers can directly affect your bottom line



High-compression linerboard corrugated cases help huge towers of detergent stand tall without damage.

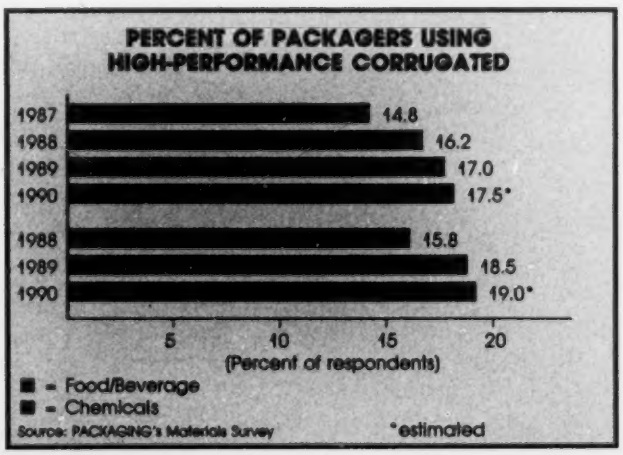
By Mark Spaulding
Associate Editor

The word just came in from corporate headquarters. The new warehouse that was supposed to be built on the East Coast next year has been cut out of the budget. That means every available inch of space at your location will have to be used. With limited footage, the only solution is to stack higher.

You begin drawing up the necessary plans when the warehouse supervisor calls with still another disaster report. Two entire pallet loads of product were lost when cases on the bottom collapsed. Bottles burst and now the warehouse floor is covered with sticky fruit juice, crushed containers and soggy corrugated.

Although this scenario may sound extreme, it illustrates the increasingly important role of corrugated shipping containers in getting packaged goods safely from the factory to the consumer. According to the Association of Independent Corrugated Converters, 95 percent of all packaged products are shipped in corrugated containers.

How a shipping container performs to protect products from damage all along the distribution chain should not be underestimated. The food industry estimates the cost of damaged merchandise at $2.5 billion a year and growing. Roughly $500 million annually can be attributed to packaging performance.



Conditions changing

The recent developments in high-performance corrugated materials and containers are answering the needs of packagers in all industries. Under today's economic constraints, shippers are being stacked higher and higher in high-density warehouses. Filled cases move from low-humidity conditions at a Northern plant to a high-humidity distribution center in the South. Storage times under these changing conditions are longer, subjecting containers to greater amounts of stress from weight and the environment. To address all these factors, end-users are applying high-

performance corrugated's critical element: increased top-to-bottom compression strength in a single-wall case.

Until the introduction of high-performance corrugated, the only way to increase compression strength was to add more fiber, either in the form of thicker linerboards and mediums or by using a multiwall construction. But these methods have economic drawbacks. Not only do the cases cost more initially, they weigh more and take up more room in transport and storage. Distribution costs go up as less product is warehoused in the same amount of space and more weight has to be moved over the road.

Enter high-performance materials and the corrugated cases they become. Suppliers have been experimenting with different methods of producing a stronger shipper while simultaneously reducing the level of paper fiber needed to make a box a box. Each process lends a certain amount of extra strength, and the different methods can be combined in one container.

Cross-linked fibers

Cross-linking is a method of redirecting the wood fibers during paper production. Typically, fiber runs parallel to the machine direction. This makes the fibers go horizontally around the box after the container is formed, the worst direction for achieving a high top-to-bottom compression strength.

Cross-linking, however, forces more of the fiber to run 90° to the machine direction. As one supplier put it, it's as if all the fish in a stream were moving in the same direction. "Cross-linking is getting as many fish as possible to swim sideways," he said. The process results in more fibers running vertically up and down the sides of a case, increasing stacking strength without adding fiber.

The measure of a linerboard's strength under cross-linking is its ability to withstand ring crushing. A half-inch wide strip of linerboard 6 inches long is formed into a ring and subjected to pressure. The number of pounds needed to crush it is the material's ring-crush strength. High-ring liners mated to a high-ring medium maximize the crush resistance of a case's vertical sides and increases the all-important compression strength.

High-pressure forming

High-pressure board forming is another strengthening method performed during the paper manufacturing process. Basically, it involves extending the point of pressure on the paper fibers to more tightly compress them. This creates a denser sheet of material, and the denser the paper the stronger it becomes. High-pressure board forming also tends to squeeze more water out of the pulp, but this is not as important as the end result of a denser linerboard.

Both cross-linking of fibers and high-pressure board forming fall under the category of "papermaking art," according to one supplier who employs both methods. He likens the process to the art of brewing: a combination of technology and technique.

Chemical benefits

The addition of various chemicals to the fibers—both before and after paper manufacturing—offers a third way to increase the critical compression strength of a corrugated container. These additives serve to enhance fiber bonding and include products such as corn starch, glues, adhesives, PCBs and heavy metals, and plastic- and urea-formaldehyde-based resins. Curtain coating of external chemical sprays are sometimes used to strengthen fibers as well.

Using chemical additives is generally less expensive than cross-linking or other methods. But their usefulness ends where the cost of their application is greater than simply increasing the weight of the linerboard or medium to achieve a stronger box.

Multiple mediums

The fourth major innovation in creating a high-performance corrugated is based on laminating two or more layers of medium together before turning them into a corrugated board. The laminator can be a simple cornstarch adhesive, producing a super-strong medium to be sandwiched between cross-

The papermaking process is a critical stage in the production of high-performance corrugated materials.

Use of super-strong corrugated cases is growing at a healthy pace industrywide

linked, pressure-formed or regular-strength linerboard.

Double-medium corrugated boxes retain a thin single-wall construction, yet can outperform double-wall boxes weighing up to 10 percent more. Double-medium containers also offer greater ring-crush resistance which again improves compression strength and performance when stacking pallet loads three high.

Recyclability questions

An increasingly important concern of packagers using high-performance corrugated is the use of recycled fiber in new containers. Chemical additives such as PVC-based resins make the pulp harder to break down for reuse, and PCBs or heavy-metal additives at the parts-per-million level contaminate the pulping stream.

Most suppliers agree, however, that problems are extremely limited. Difficulty would come, they say, only when the repulper would get truckload after truckload of chemically-modified corrugated to turn back into new boxes on the same day—a highly unlikely occurrence.

Box of Tomorrow

What is the ultimate high-performance case? What can packagers expect of the technology in the coming years? According to some suppliers, the tide of innovation will subside.

"The ability to cross-link more of the paper fibers will not go much farther," said one. "We can expect high-performance corrugated to move forward a litte bit more, perhaps not more than 10 percent better in cost-performance than what's available today."

Some suppliers believe a combination of technologies will be emphasized. "We'll see a combination of options being made available," said another, "adding more emphasis on the overall box design or box styles."

No matter what advances may emerge in the field of high-performance corrugated, packagers are sure to be offered a wider array of options to meet their case-packing—and ultimately, their overall product protection—needs. ■

QUICK REFERENCE CHART: HIGH-PERFORMANCE CORRUGATED CONTAINERS

Information for this chart was compiled from responses to PACKAGING's questionnaire, which was sent to suppliers of corrugated containers. To obtain further information about the products and services offered by the companies listed, circle the corresponding numbers on the reader service card.

	Fiber Recycling				Technology Used to Increase Performance						
Company	Manufacturer	Distributor	Board uses recycled fiber	Board is 100% recyclable	Chemical additives	Cross-linked fibers	High-pressure board forming	Double medium	Other	Circle No.
Boise-Cascade, Corrugated Container Div.	•		•	•			•			501
Chesapeake Packaging, Color-box Div.	•		•	•					E/B cross-flute; Ultra Flute	502
Great Southern Paper Co.	•		•	•		•				503
Green Bay Packaging, Inc.	•		•		•		•		Twin-wire formation	504
Hudson Associates, Inc.		•	•	•		•	•	•		505
Inland Container Corp.	•		•	•	•	•	•	•	Refining; chemistry	506
International Paper	•		•		•	•	•			507
Jefferson Smurfit/Container Corp. of America	•		•	•	•	•		•		508
Menasha Corp.	•		•	•	•	•	•		High-ring liners and medium	510
Nekoosa Packaging	•		•	•		•	•	•	Statistical process control	511
Packaging Corp. of America	•		•	•	•			•	Multi-arch board; semi-chemical mediums; bonding agents	512
Stone Container Corp.	•		•	•		•	•		High-strength medium; A-flute	513
Tharco	•		•				•			514
Union Camp Corp.	•		•	•		•	•			515
Westvaco Corp., Container Div.	•			•		•				516
Weyerhauser Co.	•		•	•		•	•		Fiber selection and refining	517
Willamette Industries, Western Kraft Div.	•		•			•	•	•		518

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Plastic cole-slaw cups are another example of a product in need of a high-performance corrugated case to protect it from crushing.

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MARK SPAULDING
Associate Editor

"The emergence of high-performance corrugated points up the value-added trend in packaging materials in general. The plain brown case is not a commodity anymore."

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